

ABSTRACT OF THE DISCLOSURE

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A very large virtual volume (e.g., in excess of 500GB) is formed by distributing the disks in eleven, six-disk RAID-5 sets across the six busses of a primary local back-end controller. A spare disk is provided on each of the six busses.

- 5 Each RAID-5 set is protected from the failure of a single disk by the spare disks on the busses, which can use the parity data stored in a RAID-5 set to rebuild the data stored on a failing disk and thereby restore redundancy to the RAID-5 set. Each RAID-5 set is also protected from the failure of a bus by the parity inherent in RAID-5. The RAID-5 sets are striped by a front-end controller connected to the
- 10 primary local back-end controller, and the striped RAID-5 sets are presented to a host computer as a very large virtual volume. If the individual disks are 9.1GB in size, the size of the very large virtual volume can reach 500.5GB. If desired, additional groups of eleven, six-disk RAID-5 sets can be formed on additional back-end controllers for purposes of redundancy, cloning (which generates a copy of the data that can be used
- 15 for off-line backup without interrupting read/write activities on the virtual volume), and disaster tolerance through remote storage. These additional groups of RAID-5 sets, along with the RAID-5 sets from the primary local back-end controller, can be formed into mirror sets by the front-end controller, which then stripes the mirror sets and presents the striped mirror sets to the host computer as the very large virtual
- 20 volume.